

ATTACHMENT C

NIH/NIDCR CONSENSUS DEVELOPMENT CONFERENCE (CDC) ON CARIES

SUBSECTION ON SALIVA AS A RISK FACTOR IN CARIES

EVIDENCE TABLE 1A.

AUTHOR	Y E A R	GENERAL DESCRIPTION			EXPERIMENTAL DESIGN CHARACTERISTICS					
		AHRQ Score	Data Extraction Source Study Funding Study Setting	S t u d y L e n g t h	Sampling Method and Response Rate	Training and Reliability of Examiners	Confounding Factors and Controls	Blinding	Number/ Reasons Subjects Lost	Statistics/ Methods of Data Analysis
Almstahl et al.	1999	II-2	Article Foundation (Doctoral Research) University	ND/NA	Subjects with either Primary Sjögren's Syndrome (pSS) and Secondary Sjögren's Syndrome (sSS)	ND/NA	Effects of SS disease duration was evaluated; time of saliva collection was standardized	ND/NA	ND/NA	Student's t test; Linear regression
Bergman and Ericson	1986	II-3	Article ND/NA University	3 years	43 subjects given removable partial dentures by dental students during spring 1979 were initially recruited	ND/NA	Controlled for dietary and oral hygiene habits, fluoride use and salivary microbial counts	ND/NA	9 subjects lost by the 3-year follow-up; Of these 2 died, 4 moved and one was too ill to continue participation	Chi-squared test
Bhatia et al.	1986	II-2	Article ND/NA University	ND/NA	Subjects were chosen from child and adult patient volunteers in a dental school	ND/NA	Controlled for general medical health	ND/NA	ND/NA	Student's t-test; Point biserial coefficient correlation

Camling and Köhler	1987	II-2	Article _____ Swedish MRC _____ University	ND/NA	Subjects were first born children who, along with their mothers, participated in a previous longitudinal study to examine transmission of Mutans streptococci	ND/NA	Controlled for salivary microbial counts	ND/NA	Saliva samples were not obtained from 4 of the original 64 children	Student's t-test; Wilcoxon rank sum test
Chia et al.	1997	II-2	Article _____ Taiwan National Science Council; University _____ University	ND/NA	Volunteers randomly selected from among university students during routine physical examination	ND/NA	ND/NA	ND/NA	ND/NA	Student's t-test; Correlation coefficients; ANOVA
Collin et al.	1998	II-2	Article _____ Hospital Research Fund _____ University; Hospital	ND/NA	Both groups recruited from among 180,000 inhabitants of one county over 31 months, 68% response from both non-insulin dependent diabetes mellitus (NIDDM) patients and controls; controls randomly selected; refusals due mainly to medical reasons and advanced age	One examiner performed all clinical examinations	Stepwise logistic regression model evaluated the following variables with the presence of caries: gender, age, No. teeth, stimulated salivary flow, frequency of dental treatment, plaque score, microbial counts, concomitant medical conditions, poor diabetic control, smoking and timing of saliva collection	ND/NA	65 NIDDM and 58 controls subjects lost due to death, newly diagnosed NIDDM or edentulism	Student's t test; Chi-square test; Test for uncorrelated proportions; Backward stepwise logistic regression
Coogan and Motlekar	1996	II-2	Article _____ ND/NA _____ University	ND/NA	Subjects were recruited from among urban Blacks presenting for routine dental treatment	One examiner performed all clinical examinations	Controlled for dietary habits and oral hygiene status	ND/NA	ND/NA	Kruskal-Wallis ANOVA

Dahllöf et al.	1989	II-2	Article _____ Swedish Dental Society _____ University	ND/NA	68 children born with clefts (all types) during 1980-1981 in one county were called in for examination and participation, 72% response, nonenrollments due to death, medical, personal or moved away; 49 controls chosen from university dental patients born during 1980-1981	One examiner collected all saliva samples; no data on clinical and radiographic examinations	No patients received orthodontic treatments; parents were interviewed for children's dietary and oral hygiene habits and fluoride use	ND/NA	ND/NA	Mann-Whitney-U test; Chi-square test
Dahllöf et al.	1997	II-2	Article _____ Swedish MRC; Foundations _____ University	4 years	Control subjects were selected from children receiving annual dental checkup; no data on cancer patients	ND/NA	Controlled for salivary microbial counts, oral hygiene habits and fluoride exposure; Cancer patients received individualized preventive program (including fluoride treatment)	ND/NA	Out of an original 56 children who received bone-marrow transplant, 27 died during follow-up period and three refused saliva collection	Mann-Whitney U test; Wilcoxon-signed rank test
Demers et al.	1992	II-3	Article _____ Canada Health and Welfare _____ University	1 year	428 Canadian children that participated in the baseline examination were attending kindergarten classes in 15 randomly selected schools from a non-fluoridated city	The dental examinations were performed by two dentists previously calibrated, each of them seeing about half the children; Duplicate examinations were performed in 13% of the cases and the intra-examiner reliability was very high (intra-class correlation coefficient > 0.95), the same was true for inter-examiner reliability; Saliva was collected by 4 trained hygienists	Controlled for caries experience, oral hygiene status and fluoride exposure, salivary microbial counts and socioeconomic characteristics	ND/NA	126 patients dropped out mainly due to moving and changing schools	Chi-square test; Logistic regression analysis

Dens et al.	1995	II-2	Article _____ ND/NA _____ University	ND/NA	Study group subjects were patients of a university oncology unit; Control subjects were randomly drawn from a database of 6000 patient files	All examinations were performed by one examiner	Controlled for age, sex, socioeconomic status, oral hygiene status and salivary microbial counts	ND/NA	ND/NA	ND/NA
Dens et al.	1996	II-2	Article _____ ND/NA _____ University	ND/NA	Control subjects randomly selected from 6,000 files by computer; no data on how cancer patients were selected	All examinations were performed by one dentist	Timing of saliva collection was standardized; no subjects received any prophylactic treatment (fluoride, oral hygiene instructions) before examination; plaque scores were evaluated	ND/NA	ND/NA	Spearman's correlation test; Chi-square test
Dodds et al.	1997	II-2	Article _____ Int. Life Science Inst. US Branch _____ University	ND/NA	85 healthy subjects divided into 2 groups: Caries-active (n=49) and caries-free (n=38)	One dental examiner conducted clinical assessment as well as parotid secretion collections	Subjects were non-smokers and did not take any medications	ND/NA	ND/NA	2-factor analysis of variance comparing sex and caries status with independent salivary parameters
Drake et al.	1994	II-3	Article _____ NIDCR; NIA _____ University; Community	18 months	Population consisted of community-dwelling, non-institutionalized people over 65 y from 5 contiguous counties in North Carolina; 1,018 subjects examined at baseline, 66% response rate (818 were dentate)	Five dentist examiners conducted all clinical examinations and interviews; Replicate examinations were completed on 26 subjects at baseline and 25 respondents at follow up; Intraclass correlation for interexaminer agreement was 0.97	Controlled for race; Numerous characteristics were evaluated by multivariate logistic regression	ND/NA	207 out of 818 dentate subjects were lost to follow-up; Reasons include death, illness, relocation, inability to be contacted and refusal of further participation	Chi-squared test ; Pearson's bivariate correlations; Multivariate logistic regression

Duggal et al.	1991	II-2	Article _____ ND/NA _____ University	ND/NA	276 children selected from 500 divided into 4-7 y and 12-16 y groups; each age group subdivided into three caries groups: low 0-2; moderate 3-4; high 5 and more deft/DMFT	No data on how many examiners involved in caries assessment	All study subject were in continuous residence in five rural areas of Northern India	Saliva samples were blinded	4 subjects lost due to loss of their saliva samples during transport	Analysis of variance of five trace elements in whole saliva: Zn, Cu, Fe, Mn, F; Student-Newman-Keul analysis for differences of mean concentrations between groups
Faine et al.	1992	II-2	Article _____ NIH _____ University	ND/NA	Study subjects were patients of the periodontology or prosthodontics departments at a dental school; Control subjects were from the same clinic population or surrounding community	2 calibrated faculty periodontists conducted all examinations; Intra-examiner reliability was 96% and 100% mean agreement for both examiners; Inter-examiner reliability was 98%	Controlled for dietary habits, oral hygiene status and salivary microbial counts; Subjects using xerostomic medications were excluded	ND/NA	ND/NA	Pearson's correlation; Spearman's correlation; Wilcoxon signed-rank test
Fiehn et al.	1986	II-2	Article _____ Industry _____ University	ND/NA	ND/NA	ND/NA	Controlled for oral hygiene status, recent antibiotic use, salivary microbial counts and timing of saliva collections	ND/NA	ND/NA	Mann-Whitney U test
Franco et al.	1996	II-2	Article _____ Community Dental Service _____ University; Hospital	ND/NA	Patients were selected from the pediatric cardiology departments of two hospitals in London; Controls were selected from a pediatric dental department at one hospital	Intra-examiner agreement for caries was assessed by duplicate examinations on 10% of the sample; Kappa ranged 0.83-0.89	Controlled for age, sex, socioeconomic status, dietary and oral hygiene habits, fluoride exposure, oral hygiene status and salivary microbial counts	ND/NA	ND/NA	Chi-square test; Mann-Whitney; Fisher's exact probability; Spearman's rank correlation; Authors stated that "multiple regression proved fruitless"

Fure	1998	II-3	Article Foundation University	5 years	A random sample of 60-, 70-, 80-year-old inhabitants of one Swedish city was recruited	The same examiners used the same technique at baseline and follow-up examinations	Controlled for dietary and oral hygiene habits, time of last dental visit, use of drugs with xerostomic side-effects, antimicrobial treatment in the previous 2 months, feeling of dryness, microbial counts and timing of saliva collection	ND/NA	29% of patients lost due to death (11%), illness (7%), personal reasons (6%), moving away (4%) and edentulism (1%)	Paired Student's t test; 2- and 3-factor ANOVA; Correlation coefficients; Stepwise regression analyses
Furhoff et al.	1998	II-2	Article Swedish MRC; University; Foundation University	ND/NA	Dental amalgam-related symptomatic patients referred to the dental school were recruited, 74% accepted; Control subjects were randomly selected from the county register, 47% accepted	ND/NA	Controlled for age, gender, marital status, education, occupational status, self-reported health status, self-reported prevalence of symptoms during the last three months	ND/NA	ND/NA	Paired Student's t test; McNemar's test; Wilcoxon signed-rank test
Gavaldá et al.	1999	II-2	Article ND/NA University; Hospital	ND/NA	ND/NA	ND/NA	Controlled for duration of hemodialysis, oral hygiene status and periodontal status; Underlying medical condition causing renal failure was known for 59 patients	ND/NA	ND/NA	Student's t-test; Chi-square test
Gregory et al.	1986	II-2	Article NIDCR University	ND/NA	ND/NA	ND/NA	Controlled for oral hygiene status and salivary microbial counts	ND/NA	ND/NA	Paired Student's t test; ANOVA

Gregory et al.	1990	II-2	Article _____ NIDCR _____ University	ND/NA	Caries-resistant (CR) and caries-active (CA) volunteers were recruited from the patients and students of two universities	ND/NA	Controlled for age, sex, race, oral hygiene, salivary microbial counts and fluoride use, which was found not to affect DMFS	ND/NA	ND/NA	Spearman's rank correlation; Mann-Whitney U test; Kruskal-Wallis test; One-way ANOVA
Gregory et al.	1991	II-2	Article _____ NIDCR; Industry _____ University	ND/NA	Recruitment method previously described (Gregory et al., 1986)	ND/NA	ND/NA	ND/NA	ND/NA	Mann-Whitney-U test
Gregory et al.	1995	II-2	Article _____ NIDCR _____ University	ND/NA	Caries-resistant (CR) and caries-active (CA) volunteers were recruited from the patients and students of two universities (different population than in Gregory et al. 1990)	ND/NA	Controlled for age, sex, race and salivary microbial counts	ND/NA	ND/NA	ND/NA
Grindefjord et al.	1995	II-3	Article _____ Swedish Dental Society; Government _____ University	1 year	1,095 1-year-old children from 8 suburbs of Stockholm examined in an earlier study were re-examined at age 2.5 years (n=832 children) and at age 3.5 years (n=692)	Examination at 2.5 y and 3.5 y was performed by the same 2 dentists at 4 dental clinics, each examined 50% of the subjects	Controlled for socioeconomic status and immigration background, salivary microbial counts, dietary and oral hygiene habits and fluoride exposure	ND/NA	140 children were lost: 42% moved away, 11% refused continued participation & 47% failed to keep appointments	Student's t test; Chi-square test; Mann-Whitney U test

Guivante-Nabet et al.	1999	II-3	Article _____ ND/NA _____ Hospital	15 months	1,204 hospitalized patients from 2 main geriatric hospitals in France were observed and screened against strict inclusion and exclusion criteria; 117 subjects were examined at baseline	Two trained dentists performed the examinations; Inter-examiner calibration was conducted using 1,017 surfaces in 7 subjects (Kappa=0.62)	Controlled for age, gender, oral hygiene status, type of hospitalization, period of stay, removable prosthesis, salivary microbial counts, general pathologies, number of diagnosed diseases and medications with hyposalivary side-effects	ND/NA	Only 32 out of 117 subjects were evaluated in the 15-month follow-up; Reasons for drop-out included moving away, serious debilitation and death	Student's t test; Chi-square test; ANOVA; ANCOVA; Linear regression;
Hallett et al.	1995	II-2	Article _____ ND/NA _____ Hospital	ND/NA	Contact letter and one follow-up phone call generated from retrospective record review was used to identify potential subjects utilizing rehabilitation service within the previous 5 years; 94 total subjects were enrolled	3 investigators performed the examinations	Controlled for salivary microbial counts; Demographic, medical, and dietary histories were obtained from parents	Investigators were blinded to subject medical history or surgical treatment for drooling	ND/NA	Student's t test; Chi-square analysis test; Wilcoxon-signed Rank test; Pearson correlation; Regression analysis
Hellyer et al.	1989	II-3 or III (?)	Abstract _____ ND/NA _____ ND/NA	ND/NA (Subjects were "part of a longitudinal study")	Subjects were recruited from among those attending a general dental practice and living in the community	ND/NA	Controlled for dietary habits, denture wearing and salivary microbial counts	ND/NA	ND/NA	ND/NA
Hocini et al.	1993	II-2	Article _____ Industry _____ University; Hospital	ND/NA	ND/NA	ND/NA	ND/NA	ND/NA	ND/NA	Mann-Whitney test

Holbrook	1993	II-3	Article Icelandic Council of Science; University; Swedish Government University	2 years	Approx. 45% of 4 year old children attending the main Reykjavik Health Centre enrolled in the study; this represented 10% of all 4—year-olds in the city	2 examiners performed examinations at baseline and one-year follow-up; 1 individual examined the subjects at the two-year follow-up	Controlled for salivary microbial counts and, by parents' questionnaire, the medication use, fluoride exposure, dietary and oral hygiene habits	ND/NA	Of the original 158 4 year olds, 81% remained by age 5 and 70% by age 6; Dropouts due mainly to moving away and to medical or personal reasons	Student's t test
Holbrook et al.	1993	II-3	Article Icelandic Council of Science; University University	2 years	Approx. 45% of 4 year old children attending the main Reykjavik Health Center enrolled in the study; this represented 10% of all 4-years-old in the city	2 examiners performed examinations at baseline and one-year follow-up; 1 individual examined the subjects at the two-year follow-up	Controlled for salivary microbial counts and, by parents' questionnaire, the medication use, fluoride exposure, dietary and oral hygiene habits	ND/NA	Of the original 158 4 year olds, 81% remained by age 5 and 70% by age 6; Dropouts due mainly to moving away and to medical or personal reasons	Student's t-test; Stepwise regression analysis
Johansson et al.	1992	II-2	Article Swedish Dental Society; Foundation; Industry University	ND/NA	Children were selected from 8- to 12-year old pupils attending one school in India; Age- and sex-matched controls were recruited from Sweden	Caries was recorded by one dentist	Controlled for oral hygiene habits, fluoride exposure, salivary microbial counts and timing of saliva collection; Note that the Indian children lived in low fluoride areas, did not use dentifrice or toothbrush and had lower socioeconomic status than the Swedish children	ND/NA	ND/NA	Unpaired Student's t test; ANOVA; Non-parametric tests

Kirstilä et al.	1994	II-2	Article Academy of Finland; Finnish Dental Society; Foundation University; Hospital	ND/NA	Subjects with common variable immunodeficiency (CVI) were recruited from a hospital; Controls were healthy, age- and sex- matched subjects recruited mainly from the staff and patients of a university dental clinic	All clinical examinations were carried out by the same experienced dentist	Controlled for dietary and oral hygiene habits, fluoride exposure, salivary microbial counts and smoking status	ND/NA	ND/NA	Paired Student's t test
Kirstilä et al.	1998	II-3	Article Academy of Finland; Finnish Dental Society University	2 years	Contact letter sent to homes of all 12-year-old patients of one dentist practicing in a city public health center dental clinic	All clinical and radiographic examinations were carried out by the same experienced dentist; Intra-examiner variability was not assessed	Controlled for fluoride exposure, salivary microbial counts, leukocyte-derived myeloperoxidase, smoking status and timing of saliva collection	The examiner was blinded to laboratory results.	6 children were excluded due to moving away, personal reasons and loss to follow-up	Paired Student's t test; Kolmogorov-Smirnov test; Spearman-rank correlation; Cluster analysis
Laurikainen and Kuusisto	1998	II-2	Article ND/NA Hospital	ND/NA	Asthmatic subjects enrolled from hospital clinic	ND/NA	Effects of socioeconomic status, smoking, severity of asthma, tobacco use, alcohol use and sugar intake were evaluated	ND/NA	4 were excluded due to lack of a suitable control partner	Analysis of covariance; Wilcoxon rank sum test (95% confidence interval)
Lenander-Lumikari et al.	1998	II-2	Article Finnish Dental Society Hospital	ND/NA	Asthmatic subjects enrolled from hospital clinic	ND/NA	Effect of smoking was evaluated	ND/NA	ND/NA	Student's t test; Analysis of covariance; Wilcoxon rank sum test (95% confidence interval)
Lowe et al.	1997	II-2	Article ND/NA University	ND/NA	Children 12-years old attending schools receiving community dental services from one author were recruited	ND/NA	Controlled for age, race, water fluoride exposure and timing of saliva collections	ND/NA	ND/NA	3-way general linear model analysis

Lundgren et al	1997	II-3	Article Government & University; Foundations University	4 years	Independent-living, community-dwelling very elderly subjects were recruited; Out of 454 patients initially screened 92 dentate subjects were included in the baseline study	One examiner performed all clinical examinations	Controlled for medication use, activities in daily living (ADL), oral hygiene status and salivary microbial counts	ND/NA	68 patients were not re-examined at follow-up due mainly to severe debilitation	Student's t test; Chi-square test; Spearman's rank correlation; Pitman permutation test
MacEntee et al.	1993	II-3	Article Provincial Foundations University; Nursing homes	1 year	Elderly subjects were recruited from residents in 9 long-term care (LTC) facilities and from among independently living community dwelling individuals	Three experienced examiners performed all evaluations	Controlled for age, dietary habits, oral hygiene status, general health status, use of xerostomic medications and salivary microbial counts in multivariate models	ND/NA	205 subjects initially identified; 156 subjects evaluated after one year, reasons for 49 drop-outs unknown	Chi-square test; Logistic regression analysis (multivariate models)
Meurman et al.	1997	II-3	Article Finnish Dental Association University; Hospital	5 years	79 patients treated with one of three hybrid chemotherapy protocols for lymphoma were initially enrolled in the study	ND/NA	Controlled for chemotherapy regimen, antimicrobial therapy, salivary microbial counts, smoking status and type of dental prostheses	ND/NA	Only 22 subjects remained for 5-year follow-up; Reasons for drop-out include death, moving away and refusal to be examined	Student's t-test; ANOVA
Milosevic and Slade	1989	II-2	Article ND/NA University	ND/NA	ND/NA	ND/NA	Effects of age, oral hygiene habits and disease severity were evaluated	ND/NA	ND/NA	ANOVA; Pearson Correlation Coefficient; Chi-square test

Najera et al.	1997	II-2	Article ND/NA University	ND/NA	Sjögren's Syndrome (SS) patients recruited from a university Salivary Dysfunction Clinic	One examiner performed all examinations	Controlled for age, sex, race, periodontal status, general medical status, tobacco use, oral hygiene status and timing of saliva collections	ND/NA	ND/NA	Student's t-test; Chi-squared test
Närhi et al.	1996	II-2	Article Finnish Dental Association; Foundations University; Hospital	ND/NA	Elderly subjects recruited from a large population-based health study (Helsinki Aging Study) which initially included 55 subjects with non-insulin dependent diabetes mellitus (NIDDM)	Four faculty examiners performed all clinical examinations; interexaminer agreement $Kappa \geq 0.91$	Controlled for age, gender, periodontal status, subjective dry mouth symptoms and salivary microbial counts	ND/NA	23 out of the original 55 subjects with NIDDM were not included in the final study population	Contingency tables; Spearman's rank correlation; ANOVA and Scheffé's F test
Närhi et al.	1999	II-3	Article Finnish Dental Association University	5 yrs	Elderly subjects recruited from a large population-based health study (Helsinki Aging Study); 270 community-dwelling elderly subjects at baseline recruited from 484 (56% response rate); 110 subjects reexamined at 5-year follow-up	Four faculty examiners performed all clinical examinations; Interexaminer reliability assessed by repeat measurements of 19 subjects by 2 examiners; interexaminer agreement $\geq 0.89\%$	Controlled for age, gender, dentition, medication use, salivary microbial counts and timing of saliva collections; Comparison was made of baseline measures between subjects who dropped out and those who remained	ND/NA	Between baseline and follow-up 160 out of 270 subjects lost; 61 had died, 74 were hospitalized or had moved and 25 refused to participate	Student's t-test; Pearson correlation coefficients; ANOVA; Chi-square test; Multiple regression analysis; Logistic regression analysis
Näsman et al.	1994	II-2	Article Foundation University; Hospital	ND/NA	Study subjects were pediatric oncology patients from two hospitals; Control subjects were selected from children receiving annual dental checkup at a university	ND/NA	Controlled for type of medical condition and treatment, salivary microbial counts, and oral hygiene habits; Only one of three groups (bone marrow transplant) received individualized preventive program including fluoride and chlorhexidine treatment	ND/NA	ND/NA	Chi-square test

Naspitz et al.	1999	II-2	Article Government University	ND/NA	ND/NA	ND/NA	Controlled for salivary microbial counts and timing of saliva collections	ND/NA	ND/NA	Kruskal-Wallis test
O'Sullivan and Curzon	2000	II-2	Article Industry University; Hospital	ND/NA	The study population consisted of British children referred from colleagues to a pediatric dentistry department	ND/NA	Controlled for salivary microbial counts and timing of saliva collections	ND/NA	ND/NA	Chi-square test; ANOVA
Öhrn et al.	1999	II-2	Article Government University; Hospital	ND/NA	100 consecutive patients referred from an outpatient psychiatric clinic were initially enrolled, of whom 81 were included in the study; Healthy control individuals were recruited from students at a college	The patients were examined by a hospital dentist	Controlled for salivary microbial counts	ND/NA	19% of enrolled subjects dropped out	Student's t test; Mann-Whitney U test; Multiple, logistic and stepwise regression
Pajari	1988	II-2	Dissertation University Funding University	ND/NA	Study subjects included 37 children after cancer therapy, 18 children with ongoing cancer therapy; Healthy subjects were used as matched controls	More than one examiner conducted the examinations; Intra-and interexaminer reproducibility was assessed and reported in published manuscripts	Controlled for type of cancer and treatment, oral hygiene status and salivary microbial counts	ND/NA	ND/NA	Student's t-test; Chi-square test; ANOVA
Pandey et al.	1990	II-2	Article ND/NA University	ND/NA	ND/NA	ND/NA	Controlled for confounding medical conditions and last prophylaxis (one week prior to saliva collections)	ND/NA	ND/NA	ND/NA
Parkash et al.	1994	II-2	Article Indian MRC University	ND/NA	Children were recruited from university outpatient dental service	ND/NA	Controlled for age and sex	ND/NA	ND/NA	ND/NA

Pedersen et al.	1999	II-2	Article _____ Danish Dental Association; Foundations _____ University; Hospital	ND/NA	Subjects were recruited from Sjögren's Syndrome (SS) patients referred to a dental school and hospital dental department	One examiner performed all examinations	Controlled for primary SS, age, No. of remaining teeth, plaque index, gingival index, periodontal pocket depth, smoking status and timing of saliva collection	ND/NA	ND/NA	Wilcoxon rank-sum test; Spearman rank order correlation
Pienihäkkinen.	1987	II-2 or II-3	Article _____ Finnish Dental Society; Foundation; Industry _____ University	2 years	Subjects were institutionalized children that were part of larger collaborative WHO xylitol field study in Hungary	ND/NA	Controlled for age, xylitol and fluoride use and salivary microbial counts	Neither the subjects nor their teachers were informed about the purpose or the results of salivary tests at any stage of the study	ND/NA	Logistic regression analysis
Pienihäkkinen et al.	1987	II-2 or II-3	Article _____ Industry _____ University	2 years	Subjects were institutionalized children that were part of larger collaborative WHO xylitol field study in Hungary; 433 initially at start of present study, 350 remained after two years	ND/NA	Controlled for age, xylitol and fluoride use	ND/NA	83 subjects lost to follow-up; reasons unknown	Pearson's correlation coefficient; Wilcoxon signed rank test
Pohjamo et al.	1988	II-2	Article _____ ND/NA _____ University	ND/NA	Adult diabetics and healthy controls were selected from the same area and were of the same age, sex, and social class ("social twins")	One examiner performed all clinical examinations; Reproducibility was tested by examining 13% of the study group twice (difference <1%)	Controlled for age, gender, socioeconomic status, diabetic control, dietary habits and microbial counts	Examiner was blinded to subjects' health status	Salivary data were missing from 5 diabetic subjects	Chi-square test; ANOVA
Raitio et al.	1996 a	II-3	Article _____ Finnish Dental Society; Foundation; Industry _____ University	11 months	The subjects were from a previous study (Raitio et al., 1996, Acta Odontol Scand); In the present study subjects were followed for approx. 1 year caries increment (ΔDFS)	ND/NA	Controlled for age, sex, past caries experience, salivary microbial counts and salivary sucrase activity in the multifactorial modeling	ND/NA	ND/NA	Logistic regression analysis

Raitio et al.	1996 b	II-3	Article _____ Finnish Dental Society; Foundation; Industry _____ University	11 months	Subjects were children attending elementary school in one Finnish city	One dentist performed all examinations	Controlled for oral hygiene status and salivary microbial counts; Subjects were excluded if they had a positive history of hyposalivary drug use or antibiotics within two weeks prior to examination	ND/NA	16 subjects out of 197 dropped out due to medical illness or moving	Student's t test; Chi-square test
Ravald and List	1998	II-2	Article _____ Swedish Government _____ Dental Institute; Hospital	ND/NA	Primary Sjögren's Syndrome (pSS) patients were selected from those attending a university hospital; Controls were randomly selected from dental patients registered in the city public dental service	One examiner performed all clinical examinations	Controlled for salivary microbial counts, oral hygiene status and periodontal status	ND/NA	Caries data missing from 4 pSS patients and 1 control subject due to edentul- ousness	Student's t-test; Chi-squared test; Fisher's exact test; Person product moment correlation test
Ravald et al.	1993	II-3	Article _____ Swedish Dental Society; County Government _____ University	12 years	35 out of 195 consecutive patients referred to the periodontology department were randomly assigned (18% enrollment rate); Follow-up examinations performed at baseline and 1, 2, 4, 8, and 12 years	ND/NA	Controlled for age, dietary habits, oral hygiene status and fluoride exposure, periodontal status, medical status, smoking status, salivary microbial counts; Restorations due to cervical wear were excluded	ND/NA	6 subjects lost by 12 year follow- up (17% drop out rate); Reasons include medical illness, loss of all remaining teeth and moving away	Student's t test; Mann-Whitney U test; Spearman Rank correlation; Multiple regression
Riviere and Papagianno ulis	1987	II-2	Article _____ NIH _____ University	ND/NA	ND/NA	ND/NA	Controlled for day- to-day variations in biochemical measurements (ELISA)	ND/NA	ND/NA	Student's t-test

Rose et al.	1993	II-2	Abstract _____ NIDCR _____ University	ND/NA	ND/NA	ND/NA	Controlled for residence in fluoridated communities and salivary microbial counts	ND/NA	ND/NA	ND/NA
Rose et al.	1994	II-2	Article _____ NIDCR _____ University	ND/NA	Subjects in both study and control groups were randomly selected from patients at a university pediatric dental clinic	One clinician examined all subjects and collected all saliva samples	Controlled for age but not gender, negative medical history and medication use, individual differences in flow rate and sIgA concentrations, salivary microbial counts and timing of saliva collections	ND/NA	ND/NA	Student's t-test
Ruhl et al.	2000	II-2	Abstract _____ Government _____ University	ND/NA	ND/NA	ND/NA	ND/NA	ND/NA	ND/NA	Pearson correlation coefficient; Unweighted pair group method (UPGMA)
Ryberg et al.	1987	II-2	Article _____ ND/NA _____ University	ND/NA	Children with chronic asthma were selected randomly; control subjects were age- and sex-matched non-asthmatics from the same social background; none of the participants was a smoker	One examiner performed all clinical evaluations	Effects of medication use, fluoride exposure and diet were evaluated	Examiner was blinded to the asthma status	1 subject excluded from study due to lack of parotid saliva	Student's t test; Chi square test

Ryberg et al.	1991	II-2	Article _____ ND/NA _____ University	4 years	21 out of 24 children with chronic asthma from a previous study; Control subjects were age- and sex-matched non-asthmatics from the same social background	ND/NA	Effects of medication use, fluoride exposure, oral hygiene status and diet were evaluated; Controlled for timing of saliva collections	ND/NA	One female who failed to secrete parotid saliva, 3 controls and 2 asthmatics had no aggregation activity, one control had no sIgA; these pairs were omitted from comparison of these variables	Student' s t-test
Rytömaa et al.	1998	II-2	Article _____ Foundation _____ University; Hospital	ND/NA	Females diagnosed with bulimia nervosa were enrolled from patients of a hospital psychiatry department; Controls were patients and students from several university health services	More than one examiner conducted clinical examinations; To assess intraexaminer reliability, 10 patients with dental erosions and caries were examined twice, 2 or more weeks apart; Kappa values ranged from 0.74 to 0.94	Controlled for medical status, medication use, dietary habits, oral hygiene status and salivary microbial counts	Examiners were blinded to medical status of subjects	ND/NA	Paired Student's t test; Chi-squared test
Seemann and Kage	1997	II-2	Abstract _____ ND/NA _____ University	ND/NA	All subjects were 10-year-old German children who were participants of a representative study regarding caries risk-factors	ND/NA	ND/NA	ND/NA	ND/NA	ND/NA
Sepet et al.	1998	II-2	Article _____ ND/NA _____ University	ND/NA	Leukemic children in maintenance therapy in a university department of pediatric hematology-oncology were recruited; no data on recruitment of control subjects	ND/NA	Controlled for length of maintenance period, frequency of dental visits and oral hygiene habits	ND/NA	ND/NA	Student's t-test

Sgan-Cohen et al.	1992	II-2 or III	Article ND/NA Immigration absorption centers	ND/NA	Study subjects recruited from rural Ethiopian adults and children who emigrated to Israel, control subjects were Israel hospital employees	Examiners were two calibrated specialists in dental public health; examiners were aided by pretrained recorders	Effect of diet was evaluated	ND/NA	ND/NA	Student's t test; 95% confidence intervals
Shapira et al.	1991	II-2	Article ND/NA Chronic care institution; University	ND/NA	Down Syndrome (DS) and non-Down Mentally Retarded (MR) residents of an institute were included	All examinations were performed by two examiners, one of whom specifically examined caries status	Salivary pH measures conducted at least one hour after last meal without subjects brushing their teeth; all subjects clinically examined at the same time of day	Not possible to blind examiners to the mental status of subjects	ND/NA	Mann-Whitney-U test; Kruskal-Wallis one-way ANOVA
Siamopoulou et al.	1989	II-2	Article ND/NA University	ND/NA	Study subjects had established Juvenile Chronic Arthritis (JCA); Control subjects were selected from various schools	ND/NA	Controlled for gingival status	ND/NA	ND/NA	Kruskal-Wallis test (using Chi-squared distribution)
Siamopoulou-Mavridou et al.	1992	II-2	Article ND/NA University	ND/NA	ND/NA	One dentist performed all clinical examinations	Controlled for dietary habits, fluoride exposure and timing of saliva collections	ND/NA	ND/NA	Mann-Whitney U-test
Soderholm and Birkhed	1988	II-2	Article ND/NA University	2 years	Caries-active and caries-inactive subjects were recruited from among 442 employees at a shipyard who participated in a 4-year program from 1974-1978; 68 final participants lived in and around one Swedish city	ND/NA	Controlled for dietary and oral hygiene habits, water fluoride exposure and salivary microbial counts	ND/NA	ND/NA	Chi-square test; Wilcoxon test; Mann-Whitney U test

Soto-Rojas et al.	1998	II-2	Article _____ ND/NA _____ Hospital	ND/NA	Sjögren's syndrome patients were recruited from tertiary care center in Mexico City Sept.1994-Dec. 1995; healthy controls were recruited from patients' relatives and hospital workers	One investigator performed all oral examinations and delivered questionnaires	Immunodeficient subjects, cancer patients, diabetics, and patients with connective tissue disorders were excluded; patients taking anti-mycotic, anti-depressant or anti-biotic drugs were also excluded	ND/NA	ND/NA	Mann-Whitney U test; Fischer's exact test; Chi-square test; Logistic regression
Stabholz et al.	1991	II-2	Article _____ ND/NA _____ Chronic care institution; University	ND/NA	Down Syndrome (DS) and non-Down Mentally Retarded (MR) residents of an institute were included	All examinations were performed by two examiners, one of whom specifically examined caries status	Salivary pH measures conducted at least one hour after last meal without subjects brushing their teeth; all subjects clinically examined at the same time of day	Not possible to blind examiners to the mental status of subjects	ND/NA	Mann-Whitney-U test; Kruskal-Wallis one-way ANOVA
Stiefel et al.	1990	II-2	Article _____ NIH Biomedical Research Support Grant _____ University	ND/NA	Community dwelling non-institutionalized adults with chronic mental illness (CMI) and control adults from a low-cost community clinic were recruited	Examination was conducted by a team of two dentists, two hygienists and three recorders; one dentist collect saliva, a different dentist performed clinical examinations; examiners were tested and calibrated until uniformly consistent	Subjects with serious systemic disorders were excluded; Xerostomic potential of psychotropic drugs was rated; effects of type of mental illness, socioeconomic status, oral hygiene habits, fluoride exposure, sugar consumption, smoking and alcohol use were evaluated	ND/NA	ND/NA	Student's t test; Chi-square test; ANOVA; Stepwise multiple regression

Stiefel et al.	1993	II-2	Article _____ NIDRR _____ University	ND/NA	Non random convenient sample; Contact letter sent to subjects on outpatient rosters of two rehabilitation medicine services of two medical centers in Seattle and state spinal cord injury society; controls were attendants or friends of the spinal cord patients	Examination was conducted by a team of two dentists and a dental hygienist; examiners were tested and calibrated until uniformly consistent	Effects of socioeconomic status, oral hygiene habits, fluoride exposure, sugar consumption, level of independence, smoking and alcohol use were evaluated	ND/NA	ND/NA	Student's t test; Chi-square test; ANOVA; Student-Neuman-Keuls range test
Sullivan	1990	II-3	Article _____ ND/NA _____ University	2 years	ND/NA	ND/NA	Controlled for age, dietary and oral hygiene habits, and salivary microbial counts	ND/NA	Data on buffer capacity from 2 children could not be read because of blood contamination; Saliva secretion data for 5 year olds were excluded because of their inability to expectorate	Spearman's rank correlation; Multifactorial analyses
Sullivan and Schröder	1989	II-3	Article _____ ND/NA _____ University; Public health clinic	2 years	Subjects at baseline included 105 children who were patients at one dental school and a public health dental service	ND/NA	Controlled for age, dietary habits and oral hygiene status, and salivary microbial counts	ND/NA	By the 2-year follow-up 16 children had dropped out of the study, 9 had moved from the area and 7 could not keep the appointment	Stepwise/ Multifactorial analyses

Sundh et al.	1993	II-2	Article <hr/> Swedish Dental Association; University <hr/> University	ND/NA	25 consecutive patients with Crohn's Disease attending a hospital surgery department were recruited (13 acute; 12 non-acute); 12 medically healthy controls age-and sex-matched to the non-acute group referred from university dental clinic	ND/NA	ND/NA	ND/NA	ND/NA	Student's t test; ANOVA; Mann-Whitney U test
Sundin et al.	1992	II-3 or II-2	Article <hr/> University; Foundation <hr/> University	3 years	Approx. 1,500 15-year-olds from 8 Swedish schools were initially screened January-July, 1984, using bite-wing radiographs; Of these, 75 out of 92 invited received baseline examination and were divided into no-caries, moderate caries and high caries groups	Screening bite-wing radiographs were taken by various dentists at school dental clinics; At baseline, calibration was achieved between 2 examiners; Intraexaminer reliability approx. 90%, interexaminer reliability 93%; At follow-up one examiner evaluated all radiographs; Intraexaminer reproducibility was assessed from duplicate evaluation of 20 subjects (range 88-95%)	Controlled for dietary habits, oral hygiene status and salivary microbial counts	ND/NA	By the 3-year follow-up 6 patients dropped out of the study: 2 moved away and 4 did not respond	Simple linear correlation analysis
Swanlung et al.	1992	II-2	Article <hr/> Industry <hr/> University; Hospital	ND/NA	Insulin dependent diabetes mellitus (IDDM) patients from two hospitals were invited, 53% response, no data on controls from dental clinic	One examiner performed all caries assessments, calibrated by examining 25 patients twice at three-week intervals; Kappa equals 0.75 for initial caries and 0.81 for dentin caries	Controlled for effects of IDDM control, IDDM duration, gender, age, oral hygiene habits and fluoride use	ND/NA	ND/NA	Student's t test; Pearson Linear Correlation

Tenovuo et al.	1986	II-2	Article _____ Academy of Finland _____ University; Hospital	ND/NA	Random selection of insulin dependent diabetes mellitus (IDDM) patients in one hospital; no data on controls from dental clinic	One dentist performed all clinical examinations and radiographic interpretations	Effects of onset and duration of IDDM, concomitant medical conditions, smoking, sucrose consumption (low), time of last comprehensive dental care, subject age and timing of saliva collection	ND/NA	ND/NA	Student's t test; Wilcoxon test
Touyz et al.	1993	II-2	Article _____ ND/NA _____ University	ND/NA	ND/NA	ND/NA	ND/NA	ND/NA	ND/NA	Student's t test; Chi-square test; Kruskal-Wallis test
Tukia-Kulmala and Tenovuo	1993	II-3	Article _____ Academy of Finland; Foundation _____ University	9 months	Children were chosen from one Finnish city and its surroundings; children with orthodontic appliances were excluded	Examinations were performed by 6 non-calibrated dentists at both the initial and follow-up time-points	Controlled for water fluoride exposure, salivary microbial counts, initial (baseline) DMFS and salivary flow rate, and timing of saliva collections	ND/NA	ND/NA	Student's t test; Chi-square test; Spearman's rank correlation
Twetman et al.	1989	II-2	Article _____ ND/NA _____ University; Hospital	ND/NA	The diabetes group was randomly selected from university and hospital out-patients; the control group was selected as "social twins" to the diabetes children (class-mates, friends or in two cases siblings)	ND/NA	Controlled for frequency of dental visits, water fluoride exposure, degree of diabetes control, salivary microbial counts and timing of saliva collections	ND/NA	ND/NA	Student's t-test; Wilcoxon test; Pearson correlation test.

VanWuyckh uyse et al.	1995	II-2	Article _____ NIDCR _____ University	ND/NA	A large group of individuals from the City of Rochester were screened; 1,200 adults age ≥ 50 y who grew up prior to water fluoridation and the introduction of topical fluoride agents; 3,000 children exposed to fluoride	ND/NA	Controlled for age, sex, fluoride exposure, dietary and oral hygiene habits, general medical health, lack of xerostomic drug use and timing of saliva collections	ND/NA	Only 56 total subjects apparently met all the criteria for inclusion in the present study	Mann-Whitney test; Bonferroni-corrected multiple comparison; Linear regression
Vehkalahti et al.	1996	II-3	Article _____ ND/NA _____ University	28 months (average); Retrospective follow-up	230 patients who participated in the university dental care program were screened; 66 caries-susceptible subjects who met inclusion criteria were selected	4 experienced calibrated faculty conducted all examinations	Controlled for oral hygiene status, salivary microbial counts and timing of saliva collections	ND/NA	7 subjects moved away and were not included in the final sample of 66 subjects	Chi-square test; Correlation coefficients using Fisher's transformation
Vranic et al.	1991	II-2	Article _____ ND/NA _____ University; Hospital	ND/NA	ND/NA	ND/NA	Controlled for timing of saliva collection	ND/NA	ND/NA	Student's t test
Wiktorsson et al.	1992	II-2	Article _____ Swedish Dental Society; Government ; University; Foundation _____ Community dental clinics	ND/NA	Based on a 1982 questionnaire, 1,035 individuals who had lived all their lives in areas with optimal vs. low fluoride concentrations in the drinking water agreed to dental examination; approx. 40% were excluded following dental examinations, with 82% response from the remaining subjects	One examiner performed all clinical examinations	Controlled for gender, socioeconomic status and fluoride exposure	ND/NA	ND/NA	Student's T-test; Chi-square test; Linear and multiple regression analysis

Wöltgens et al.	1992 a	II-3	Article Dutch Prevention Fund University	2 years	Study subjects were children being treated at a dental school	Intra-examiner reliability Kappa=0.70; Inter-examiner reliability Kappa=0.75 for occlusal surfaces and 0.92 for smooth surfaces; four consecutive examinations were performed with an approx. 6 months interval	Controlled for age variations and low caries incidence in the study group; gender differences were specifically evaluated	ND/NA	ND/NA	Two-tailed sign test
Wöltgens et al.	1992 b	II-3	Article Dutch Prevention Fund University	2.5 years	Study subjects were children being treated at a dental school; 373 Dutch children were selected at random from a group of 549 children participating in a preventive dentistry program (68% enrollment)	Two observers interpreted the radiographs independently under standardized conditions; Intra-examiner reliability Kappa=0.70; Inter-examiner reliability Kappa= 0.67	Controlled for age variations and low caries incidence in the study group; gender differences were specifically evaluated; technical problems in radiographic interpretation were considered	ND/NA	Some of the children moved away; approx. 42% of interproximal surfaces were excluded due to radiographic issues	Two-tailed sign test
Wood and Lee	1988	II-2	Article Univ. of Toronto; Canada MRC University; Hospital	ND/NA	ND/NA	One technician took all radiographs; no data on caries evaluation; no data on examiner training	ND/NA	Radiographs were interpreted independently by 2 blinded oral radiologists	ND/NA	Student's t test; Chi-square test; Linear regression
Younger et al.	1998	II-2	Article ND/NA University	ND/NA	Subjects were elderly volunteers in the oral physiology component of the Baltimore Longitudinal Study of Aging	One calibrated examiner performed all clinical examinations and saliva collections	Controlled for general medical health, medication use and socioeconomic status	ND/NA	ND/NA	Descriptive statistics; Linear regression/ regression modeling; Pearson multiple correlation
Zimmer et al.	1997	II-3	Abstract Industry University	2 years	Participant children were a representative sample of 3 city districts	ND/NA	Controlled for oral hygiene status and salivary microbial counts	ND/NA	ND/NA	Discriminant analysis was used to assess the predictive value of the combined parameters recorded at baseline

